

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANTS: Smith et al.
SERIAL NO.: Not yet assigned. GROUP NO.: Not yet assigned.
FILING DATE: Herewith EXAMINER: Not yet assigned.
TITLE: TOROIDAL LOW-FIELD REACTIVE GAS SOURCE

Mail Stop Patent Application
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

INFORMATION DISCLOSURE STATEMENT

Sir:

In accordance with the provisions of 37 C.F.R. 1.97 and 1.98, Applicants hereby make of record the patents and publications listed on the accompanying Form PTO-1449, and other information contained herein, which have been submitted for the parent cases from which this continuation application depends (continuation of prior application Serial No. 10/143,070, filed on May 10, 2002, which is a continuation of prior application Serial No. 09/659,881, filed on September 12, 2000, now issued as U.S. Patent No. 6,486,431, which is a continuation of 08/883,281, filed on June 26, 1997, now issued as U.S. Patent No. 6,150,628). In accordance with the provisions of 37 C.F.R. § 1.98(d), copies of the references are not enclosed as these references were previously cited by or submitted to the U.S. Patent and Trademark Office in the parent applications but are available upon request.

REMARKS

In accordance with the provisions of 37 C.F.R. 1.97, this statement is being filed (CHECK ONE):

- ☒ (1) within three (3) months of the **filing date** of a national application other than a continued prosecution application under 37 C.F.R. 1.53(d), or within three (3) months of the **date of entry of the national stage** as set forth in 37 C.F.R. 1.491 in an international application, or before the mailing of the **first Office action** on the merits, or before the mailing of a **first Office action** after the filing of a request for continued examination under 37 C.F.R. 1.114; or
- ☐ (2) after the period defined in (1) but before the mailing date of a **final action** or a **notice of allowance** under 37 C.F.R. 1.311, and
- ☐ the requisite Statement is below, **OR**

- ☐ the requisite fee under 37 C.F.R. 1.17(p), namely **\$180.00**, is included herein, or
- ☐ (3) after the mailing date of a **final action** or **notice of allowance** but before the payment of the **issue fee**, **AND**
- ☐ the requisite Statement is below, **AND**
- ☐ the requisite petition fee under 37 C.F.R. 1.17(p), namely **\$180.00** is included herein.

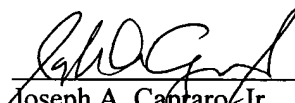
It is respectfully requested that each of the patents and publications listed on the attached Form PTO-1449, and other information contained herein, be made of record in this application.

STATEMENT

As required under 37 C.F.R. 1.97(e), Applicant(s), through the undersigned, hereby state either that [check the appropriate space only if either (2) or (3) is checked on the previous page and the Statement is required]:

- ☐ 1. Each item of information contained in the Information Disclosure Statement was first cited in any communication from a foreign patent office in a counterpart foreign application **not more than three months** prior to the filing of the Information Disclosure Statement; or
- ☐ 2. No item of information contained in the Information Disclosure Statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing this Statement after making reasonable inquiry, no item of information contained in the Information Disclosure Statement was known to **any individual** designated in 37 C.F.R. 1.56(c) **more than three months** prior to the filing of the Information Disclosure Statement.

Respectfully submitted,



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FORM PTO - 1449				ATTY DOCKET NO.: ASX-015C4			
INFORMATION DISCLOSURE STATEMENT				APPLICANTS: Smith et al.			
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U.S. PATENT DOCUMENTS							
EXAM INIT.		DOCUMENT NUMBER	DATE	NAME	CLASS	SUB CLASS	FILING DATE IF APPROPRIATE
	AA	5,290,382	03/01/94	Zarowin et al.			
	AB	3,343,022	09/19/67	Eckert			
	AC	4,431,901	02/14/84	Hull			
	AD	4,878,149	10/31/89	Stiehl et al.			
	AE	5,346,578	09/13/94	Benzing et al.			
	AF	5,401,350	03/28/95	Patrick et al.			
	AG	5,405,480	04/11/95	Benzing et al.			
	AH	5,430,355	07/04/95	Paranjpe			
	AI	5,468,296	11/21/95	Patrick et al.			
	AJ	5,479,072	12/26/95	Dakin et al.			
	AK	5,506,507	04/09/96	Schwierzke et al.			
	AL	5,514,246	05/07/96	Blalock			
	AM	3,500,118	03/10/70	Anderson			
	AN	3,663,361	05/16/72	Yoshikawa			
	AO	3,987,334	10/19/76	Anderson			
	AP	4,088,926	05/09/78	Fletcher et al.			
	AQ	4,180,763	12/25/79	Anderson			
	AR	4,252,609	02/24/81	Kerst et al.			
	AS	4,626,400	12/02/86	Jassby et al.			
	AT	4,689,192	08/25/87	Nagata			
	AU	5,254,830	10/19/93	Zarowin et al.			
	AV	5,336,355	08/09/94	Zarowin et al.			
	AW	5,556,549	09/17/96	Patrick et al.			
	AX	5,630,880	05/20/97	Eastlund			
	AY	H554	12/06/88	Dawson et al.			
	AZ	4,431,898	02/14/84	Reinberg et al.			
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	A1	H627	04/04/89	Peng			
	A2	Des. 384,173	09/23/97	Godyak et al.			
	A3	4,049,940	09/20/97	Moisan et al.			
	A4	4,065,369	12/27/77	Ogawa et al.			
	A5	4,285,800	08/25/81	Welty			
	A6	4,324,611	04/13/82	Vogel et al.			
	A7	4,350,578	09/21/82	Frieser et al.			
	A8	4,368,092	01/11/83	Steinberg et al.			
	A9	4,461,954	07/24/84	Inoue			
	A10	4,631,105	12/23/86	Carroll et al.			
	A11	4,668,336	05/26/87	Shimkunas			
	A12	4,668,366	05/26/87	Zarowin			
	A13	4,793,975	12/27/88	Drage			
	A14	4,810,933	03/07/89	Moisan et al.			
	A15	4,853,250	08/01/89	Boulos et al.			
	A16	4,859,908	08/22/89	Yoshida et al.			
	A17	4,897,282	01/30/90	Kniseley et al.			
	A18	4,906,898	03/06/90	Moisan			
	A19	4,948,458	08/14/90	Ogle			
	A20	5,000,771	03/19/91	Fleming, Jr. et al.			
	A21	5,008,593	04/16/91	Schlie et al.			
	A22	5,016,332	05/21/91	Reichelderfer, deceased et al.			
	A23	5,099,100	03/24/92	Bersin et al.			
	A24	5,144,196	09/01/92	Gegenwart et al.			
	A25	5,180,150	01/19/93	Prusak et al.			
	A26	5,198,718	03/30/93	Davis et al.			
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	A27	5,206,516	04/27/93	Keller et al.			
	A28	5,280,154	01/18/94	Cuomo et al.			
	A29	5,352,249	10/04/94	Vollaro			
	A30	5,353,314	10/04/94	Schaffer			
	A31	5,364,496	11/15/94	Bollinger et al.			
	A32	5,365,147	11/15/94	Shinohara et al.			
	A33	5,372,674	12/13/94	Steinberg			
	A34	5,394,061	02/28/95	Fujii			
	A35	5,397,962	03/14/95	Moslehi			
	A36	5,419,803	05/30/95	Mumola			
	A37	5,468,955	11/21/95	Chen et al.			
	A38	5,473,291	12/05/95	Brounley			
	A39	5,515,167	05/07/96	Ledger et al.			
	A40	5,534,231	07/09/96	Savas			
	A41	5,563,709	10/08/96	Poultney			
	A42	5,565,036	10/15/96	Westendorp et al.			
	A43	5,567,255	10/22/96	Steinberg			
	A44	5,567,268	10/22/96	Kadomura			
	A45	5,568,015	10/22/96	Holber et al.			
	A46	5,585,766	12/17/96	Shel			
	A47	5,610,102	03/11/97	Gardopee et al.			
	A48	5,637,279	06/10/97	Besen et al.			
	A49	5,639,519	06/17/97	Patrick et al.			
	A50	5,647,913	07/15/97	Blalock			
	A51	5,662,819	09/02/97	Kadomura			
	A52	5,681,393	10/28/97	Takagi			
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	A53	5,688,415	11/18/97	Bollinger et al.			
	A54	5,700,297	12/23/97	Vollaro			
	A55	5,767,628	06/16/98	Keller et al.			
	A56	5,779,849	07/14/98	Blalock			
	A57	5,798,016	08/25/98	Oehrlein et al.			
	A58	5,789,867	08/04/98	Westendorp et al.			
	A59	5,811,022	09/22/98	Savas et al.			
	A60	5,814,154	09/29/98	Boitnott			
	A61	5,834,905	11/10/98	Godyak et al.			
	A62	5,874,012	02/23/99	Kanai et al.			
	A63	5,883,470	03/16/99	Hatakeyama et al.			
	A64	5,892,198	04/06/99	Barnes et al.			
	A65	5,914,278	06/22/99	Boitnott et al.			
	A66	5,932,180	08/03/99	Zhang et al.			
	A67	5,965,034	10/12/99	Vinogradov et al.			
	A68	6,063,233	05/16/00	Collins et al.			
	A69	5,364,600	11/15/94	Stiehl et al.			
	A70	5,472,561	12/05/95	Williams et al.			
	A71	5,406,177	04/11/95	Nerone			
	A72	4,748,383	05/31/88	Houkes			
	A73	4,786,352	11/22/88	Benzing			
	A74	4,859,399	08/22/89	Bussard			
	A75	5,030,889	07/09/91	El-Hamamsy et al.			
	A76	5,153,484	10/06/92	El-Hamamsy			
	A77	5,200,595	04/06/93	Boulos et al.			
	A78	5,414,238	05/09/95	Steigerwald et al.			
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FOREIGN PATENT DOCUMENTS									
EXAM. INIT.		DOCUMENT NUMBER	DATE	COUNTRY CODE	CLASS	SUB CLASS	FILING DATE	ABSTRACT ONLY	ENGLISH LANG (Y/N)
	BA	WO90/10945	09/20/90	PCT				N	Y
	BB	SU957744 A1	02/10/96	SU				N	Y-Abstract
	BC	02260399	10/23/90	JP				Y	Y
	BD	5-166595	07/02/93	JP				N	Y-Abstract
	B1	61-139029	6/26/86	JP				N	Y-Abstract
	B2	5-144594	06/11/93	JP				N	Y-Abstract
	B3	2-260399	10/23/90	JP				N	Y-Abstract
	B4	2022917	11/15/94	RU			9/27/89	No	Yes (Translation)
OTHER ART, JOURNAL ARTICLES, ETC.									
EXAM INIT.	OTHER DOCUMENTS: (Including Author, Title, Date, Relevant Pages, Place of Publication)								
	CA	S.V. Dresvin, Physics & Tech. of Low Temp. Plasmas, H. Eckert ed, pg. 234 (1977)							
	CB	H.U. Eckert, "Analysis of Thermal Induction Plasmas between Coaxial Cylinders" <u>J. Appl. Phys.</u> 43(1):46-52 (1972)							
	CC	H.U. Eckert, "An Electrodeless Discharge at 60 Hz" <u>IEEE Trans. on Plasma Sci.</u> PS-2:308-309 (1974)							
	CD	H.U. Eckert, "The Induction Arc: A State-of-the-Art Review" <u>High Temp. Sci.</u> 6:99-134 (1974)							
	CE	H.U. Eckert, "Induction Plasmas at Low Frequencies" <u>AIAA Journal</u> 9(8):1452-1456 (1971)							
	CF	V.M. Gol'dfarb et al., "Properties of a Low-Frequency Discharge in a Transformer Plasmatron" <u>Teplofizika Vysokikh Temperatur</u> 17(4):698-702 (1979)							
	CG	E. Kandler et al., "Characterization of Plasma in an Inductively Coupled High-Dense Plasma Source" <u>Surface Coatings & Tech.</u> 74 75:539-545 (1995)							
	CH	V.A. Kogan et al., "Investigation of the Prospect for the Design of Transformer-Type Plasmotrons" <u>Teplofizika Vysokikh Temperatur</u> 31(1):105-110 (1993)							
	CI	R.A. Krakowski et al., "Prospects for Using Low-Frequency Induction Plasmas for Bulk-Chemical Processing: A Systems Analysis" First INEL Workshop on Plasma Applications to Waste Treatment, Idaho Fall, Idaho, Jan. 16-17, 1991							
	CJ	G. Soucy et al., "Parametric Study of the Decomposition of NH ₃ for an Induction Plasma Reactor Design" <u>Plasma Chem. and Plasma Proc.</u> 15(4):693-710 (1995)							
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OTHER ART, JOURNAL ARTICLES, ETC.		
EXAM INIT.	OTHER DOCUMENTS: (Including Author, Title, Date, Relevant Pages, Place of Publication)	
	CK	T.B. Reed, "Induction-Coupled Plasma Torch" <u>J. Appl. Phys.</u> 32(5):821-824 (1961)
	CL	T.B. Reed, "Growth of Refractory Crystals Using the Induction Plasma Torch" <u>J. Appl. Phys.</u> 32(12):2534-2535 (1961)
	CM	T.B. Reed, "Heat-Transfer Intensity from Induction Plasma Flames and Oxy-Hydrogen Flames" <u>J. Appl. Phys.</u> 34(8):2266-2269 (1963)
	CN	T.B. Reed, "High-Power Low-Density Induction Plasmas" <u>Communications</u> 3146-3147 (1963)
	CO	F. Maier, "Electronic Circuits for the Generation and Transfer of High-Power Pulses in Nuclear Fusion Installations" <u>IEEE Transactions on Plasma Science</u> PS-12(3): 191-198 (1984)
	CP	International Search Report dated 11/05/98 in corresponding PCT Application No. PCT/US98/13155
	CQ	Osram Endura 150W Product Information Brochure, November 1996, pp. 1-4.
	CR	Hiramatsu et al., "Generation of Strongly Ionized Aluminum Plasma in a Low-Temperature Tokamak Discharge," <u>Japanese Journal of Applied Physics</u> , Vol. 31 (July 1992) pp. 2243-2248.
	CS	Zhang et al., "A High Power Radio Frequency Transformer for Plasma Production in a Toroidal Plasma Source," <u>Rev. Sci. Instrum.</u> , Vol. 69 (January 1998) pp. 101-108.
	C1	Akulina et al., "Injection and Confinement of Plasma in a Stellarator with a Multipolar (l = 2) Helical Field," <u>Proceedings of Conference of International Atomic Energy Agency</u> (1965) pp. 733-749.
	C2	Anderson, "Electrodeless Fluorescent Lamps Excited by Solenoidal Electric Field," <u>IES Transaction, Illuminating Engineering</u> (April 1969) pp. 236-242.
	C3	Ashida et al., "Measurements of Pulsed-Power Modulated Argon Plasmas in an Inductively Coupled Plasma Source," <u>J. Vac. Sci. Technol.</u> , (Mar/Apr 1996) pp. 391-397.
	C4	Asmussen, "Electron Cyclotron Resonance Microwave Discharges for Etching and Thin-Film Deposition," <u>Journal of Vacuum Science & Technology A: Vacuum, Surfaces, and Films</u> , Vol. 7, No. 3 (May 1989) pp. 883-893. Abstract printed from Online Journal Publishing Service.
	C5	Bacri et al., "Influence of Departures From Complete Thermodynamic Equilibrium on Transport Coefficient Values: Application to an Oxygen Plasma," <u>Plasma Sources Sci. Technol.</u> , (1994) pp. 114-121.
	C6	Baldwin et al., "MgF ₂ Optical Films: Ion-Beam-Assisted Deposition of Magnesium Fluoride in a Conventional Electron Beam Evaporator and the Resulting Film Properties," <u>Society of Vacuum Coaters: 40th Annual Technical Conference Proceedings</u> (1997) pp. 1-5.
	C7	Bell, "Ring Discharge Excitation of Gas Ion Lasers," <u>Applied Physics Letters</u> , Vol. 7, No. 7 (October 1965) p. 190.
	C8	Benova et al., "Axial Distributions of Metastable Atoms and Charged Particles in an Ultrahigh Frequency Argon Plasma Column at Moderate Pressures," <u>J. Appl. Phys.</u> , Vol. 79, No. 8 (April 15, 1996) pp. 3848-3852.
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EXAM INIT.	OTHER DOCUMENTS: (Including Author, Title, Date, Relevant Pages, Place of Publication)	
	C9	Benova et al., "Theoretical Study of the Influence of a Metal Enclosure on the Parameters of a Plasma Column Sustained by a Traveling Electromagnetic Surface Wave," <u>Physica Scripta</u> , Vol. 43 (1991) pg. 68-73.
	C10	Bhave et al., "Two- and Three-Body Ion-Electron Recombination Rate Coefficients in Neon*," <u>Aust. J. Phys.</u> , Vol. 48 (1995) pp. 503-513.
	C11	Bishop et al., "Power Balance Measurements and Particle Loss Rate in Ohmically Heated Discharges in the C Stellarator," <u>Plasma Physics and Controlled Nuclear Fusion Research: Proceedings of Second Conference of International Atomic Energy Agency</u> , Vol. 2 (1966) pp. 673-685.
	C12	Bluem et al., "Spatial Investigation of a Large Diameter Microwave Plasma," <u>J. Phys. D: Appl. Phys.</u> Vol. 28 (1995) pp. 1529-1533.
	C13	Böhle et al., "On the Influence of Excited Atoms on the Electron Kinetics of a Surface Wave Sustained Argon Plasma," <u>Plasma Sources Sci. Technol.</u> Vol. 3 (1994) pp. 80-87.
	C14	Boisse-Laporte et al., "Microwave Discharges Produced by Surface Waves in Argon Gas," <u>Journal of Physics D: Applied Physics</u> , Vol. 20 (February 14, 1987) p. 197.
	C15	Bol, "Density Fluctuations in the Etude Stellarator," <u>The Physics of Fluids</u> , Vol. 7, No. 11 (November 1964) pp. 1855-1856.
	C16	Bollinger et al., "Rapid, Nonmechanical, Damage-Free Figuring of Optical Surfaces Using Plasma-Assisted Chemical Etching (PACE): Part I Experimental Results," <u>SPIE Vol. 966 Advances in Fabrication and Metrology for Optics and Large Optics</u> (1988) pp. 82-90.
	C17	Bollinger et al., "Rapid, Non-Contact Optical Figuring of Aspheric Surfaces With Plasma Assisted Chemical Etching (PACE)," <u>SPIE Vol. 1333 Advanced Optical Manufacturing and Testing</u> (1990) pp. 44-57.
	C18	Bollinger et al., "Rapid Optical Figuring of Aspherical Surfaces With Plasma Assisted Chemical Etching (PACE)," <u>SPIE Vol. 1618 Large Optics II</u> (1991) pp. 14-21.
	C19	Boswell et al., "Etching of Si by SF ₆ in a Radio Frequency Double Cathode," <u>Journal of Vacuum Science & Technology B: Microelectronics and Nanometer Structures</u> , Vol. 5, No. 4 (July 1987) pp. 883-888. Abstract printed from Online Journal Publishing Service.
	C20	Bourdon et al., "Three-Body Recombination Rate of Atomic Nitrogen in Low-Pressure Plasma Flows," <u>Physical Review E</u> , Vol. 54, No. 2 (August 1996) pp. 1888-1898.
	C21	Carruth, Jr., et al., "Method for Determination of Neutral Atomic Oxygen Flux," <u>Rev. Sci. Instrum.</u> , Vol. 61, No. 4 (1990) pp. 1211-1216.
	C22	Chen, "Industrial Applications of Low-Temperature Plasma Physics*," <u>Phys. Plasmas</u> , Vol. 2, No. 6 (June 1995) pp. 2164-2175.
	C23	Cherrington, "Chapter 8: DC Discharges-The Positive Column," <u>Gaseous Electronics and Gas Lasers</u> Pergamon Press - New York (1979) pp. 144-160.
	C24	Chiu et al., "What the DryScrub® System Can Do For PFC Gas Treatment?," <u>Electrochemical Technology Corp. Brochure</u> (undated).
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	C25	Coburn et al., "Ion-and Electron-Assisted Gas-Surface Chemistry – An Important Effect in Plasma Etching," <u>Journal of Applied Physics</u> , Vol. 50, No. 5 (May 1979) pp. 3189-3196. Abstract printed from Online Journal Publishing Service.
	C26	Cohen et al., "Induced Magnetic Field Effects in Inductively Coupled Plasmas," <u>Physics of Plasma</u> , Vol. 3, No. 5 (May 1996) pp. 1839-1847. Abstract printed from Online Journal Publishing Service.
	C27	Collins et al., "Measurement of the Rate Coefficient for the Recombination of He ⁺ with Electrons*," <u>Physical Review A</u> , Vol. 6, No. 4 (October 1972) pp. 1545-1558.
	C28	Darchicourt et al., "Influence of the Radial Electron Density Profile on the Determination of the Characteristics of Surface-Wave-Produced Discharges," <u>J. Phys. D: Applied Physics</u> , Vol. 21 (1988) pp. 293-301.
	C29	Denneman, "Determination of Electromagnetic Properties of Low-Pressure Electrodeless Inductive Discharges," <u>J. Phys. D: Appl. Phys.</u> (1990) pp. 293-298.
	C30	Eckhardt et al., "Comparison of Alkali Plasma Loss Rates in a Stellarator and in a Toroidal Device With Minimum Mean-B Properties," <u>Plasma Physics and Controlled Nuclear Fusion Research: Proceedings of Second Conference of International Atomic Energy Agency</u> , Vol. 2 (1966) pp. 719-731.
	C31	Evans, "Discussion (of 'Electrodeless Fluorescent Lamps Excited by Solenoidal Electric Field' by Anderson)," <u>IES Transaction, Illuminating Engineering</u> (April 1969) pp. 242-244.
	C32	Feoktistov et al., "Self-Consistent Modeling of Low-Pressure RF Discharges in Oxygen Plasma," <u>J. Phys. D: Appl. Phys.</u> Vol. 26 (1995) pp. 1346-1353.
	C33	Ferreira, "Theory of a Plasma Column Sustained by a Surface Wave," <u>J. Phys. D: Appl. Phys.</u> (1981) pp. 1811-1830.
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